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## Glossary

Brief definitions of key terms used in this forest land plan

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# Glossary

## A

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**Active management:** Intervening in the development of a forest stand through planting, thinning, managing competing vegetation, harvesting, or other stand management activities. In the context of the management pathways for implementation of the northern spotted owl conservation strategy, active management means thinning.

**Adaptive management:** A formal process for continually improving management practices by learning from the outcomes of operational and experimental approaches (Bunnell and Dunsworth 2009).

**Age class:** A grouping of trees in the same age group used to simplify data that describes age composition for a stand or landscape. Age classes are often divided into decadal groups to portray the distribution of tree ages within a stand, or stand origin dates on a landscape.

## B

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**Basal area:** The cross-sectional area of all stems in a stand measured at breast height. Generally expressed in square feet per acre.

**Biodiversity:** The full range of life in all its forms (Washington Biodiversity Council).

**Biodiversity pathways:** An approach to achieving goals of biodiversity and conservation while also supporting revenue production in managed stands that was popularized by research biologist Andrew Carey. Biodiversity pathways consists of the following principles: retention of biological legacies at harvest (snags, down wood, large trees, and other features) and soil organic matter; pre-commercial thinning to bypass the competitive exclusion stage and promote woody plant diversity; thinning at variable densities to promote heterogeneity; natural regeneration of western hemlock, western redcedar, and deciduous trees; and longer rotations (70-130 years).

## C

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**Cable logging.** A logging technique in which logs are transported from where they are harvested to a landing using a suspended cable.

**Catastrophic windthrow:** Windthrow that results from strong peak winds that occur infrequently (more than 20 years between occurrences). Such winds can damage timber across a large area, including both interior forest stands and forest stands with exposed edges.

**Clearcut:** According to Washington state forest practices rules, a harvest method in which the entire stand of trees is removed in one timber harvesting operation.

**Codominant:** A tree whose crown forms the general level of the canopy and receives light from above and little from the sides (Tappeiner II and others 2007).

**Cohort:** Portions or attributes of a forest stand that can be defined and managed for, such as large live legacy trees, discrete age classes, snags, or down wood.

**Cohort management:** A silvicultural system based on the simultaneous management of multiple cohorts within an area to meet objectives.

**Commercial thinning:** A thinning that generates revenue and is performed to meet a wide range of objectives including improving the growth of the stand, enhancing stand health, reducing tree mortality, or accelerating the development of habitat.

**Competitive exclusion:** A stand development stage in which trees fully occupy the site and compete closely for light, water, nutrients, and space. This stand development stage typically lacks the understory, snags, down wood, and other elements of structural diversity that characterizes more mature stages. *See* stand development stage.

## D

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**Detectible increase in peak flow:** A 10 percent or more increase in peak flow over unmanaged conditions.

**Demographic support:** The contribution of individual territorial spotted owls or clusters of spotted owl sites to the stability and viability of the entire population (Hanson and others 1993).

**Diameter at breast height (DBH):** The diameter of a tree measured 4.5 feet above the ground on the uphill side of the tree.

**Dispersal:** The movement of juvenile, sub-adult, and adult animals from one sub-population to another. For juvenile northern spotted owls, dispersal is the process of leaving the natal (birth) territory to establish a new territory (Forsman and others 2002; Miller and others 1997; Thomas and others 1990).

**Dominant:** A tree whose crown extends above the general level of the canopy and receives light from above and partly from the sides (Tappeiner II and others 2007).

## E

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**Ecological values:** The elements (for example, trees, wildlife, soil, and water) and natural relationships between these elements that are biologically and functionally important to the continued health of the forest ecosystem (DNR 1991).

**Ecosystem resilience:** Ability of an ecosystem to recover from disturbance.

**Edge density:** The ratio between the length of the harvest boundary and its area, which indicates the complexity of the harvest's shape.

**Effectiveness monitoring:** For the HCP, a system used to determine whether or not a management plan and its specific strategies are producing the desired habitat conditions.

**Endemic windthrow:** Windthrow that results from peak winds that occur fairly frequently (every five years or less).

**Exterior wind buffer:** Area adjacent to the interior-core buffer that protects the interior-core buffer from severe endemic windthrow.

## F

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**Fen.** A type of wetland that usually has sedge peat soils and is in contact with nutrient-rich ground and surface water. A seral stage of bogs.

**Fetch:** The length of the forest opening over which a given wind has blown. The longer the fetch and faster the wind speed, the more wind energy is imparted to the forest edge.

**Forest estate model:** A powerful, computer-based tool that enables DNR to consider the entire land base at once to find efficient and effective ways to balance multiple objectives. *See* tactical model.

**Forest rotation:** The time between planting or natural regeneration of a forest stand and stand replacement harvest.

**Forest inventory data:** A collection of measurements (such as tree height and diameter) made to calculate a set of forest attributes (such as trees per acre or basal area) at a particular point in time.

**Forest Practices:** The administrative branch of DNR responsible for regulating forest practices activities on all state and private forest lands.

**Forest practices rules** (Title 222 WAC): Standards for forest practices such as timber harvest and road construction.

**Forest Practices Board Manual:** An advisory technical supplement to the forest practices rules.

## G

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**Goal:** A desired outcome, but more specific than a vision. Goals are aspirational and worded generally to achieve broad aims, based on high-level policies (such as the HCP and *Policy for Sustainable Forests*), and are qualitative (not directly measurable). *See* vision.

**Guy line:** The cables that support the tower used in cable logging.

**Guy line circle:** A circle of trees that have been cut to avoid interference with the proper alignment, placement, or tightening of guy lines.

## H

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**Habitat conservation strategy:** Strategies in the HCP for managing specific types of wildlife habitat, such as riparian or northern spotted owl habitat.

**Hardwood conversion.** Replacing hardwood trees such as maple or alder with conifers.

**Harvest schedule:** A list of the recommended type, location, and timing of timber harvest; an expression of the tactical model's optimal solution

of when, where, and by what method to harvest stands across the land base and over time to meet multiple objectives.

**Hydrologically mature forest:** A forest with a canopy that is dense enough to intercept snowfall and often has enough vegetation to absorb water or slow its flow into the stream.

## I-K

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**Implementation monitoring:** A form of monitoring that determines whether or not a management plan (for example, the HCP) or its components are implemented as written.

**Incidental take:** The taking (harm) of a federally listed wildlife species, if such take is incidental to, and not the purpose of, carrying out otherwise lawful activities (DNR 1997).

**Integrated management:** An experimental management approach based on the premise that a working forest can be managed to provide both revenue (through timber harvest) and ecological values including healthy streams and forests and habitat for native wildlife species. This approach is different than the more common approach of dividing a forested area into large blocks that are managed for a single purpose, such as a nature preserve managed for ecological values and a working forest managed for revenue production.

**Intentional learning:** A planned and systematic learning process that focuses on a goal and is often directed by hypotheses. Intentional learning is different from incidental learning, in which learning is often unplanned and takes place sporadically, usually in association with certain occasions.

**Interior-core buffer:** A forested area adjacent to a stream managed to maintain riparian function and minimize adverse effects of upland management activities on riparian areas.

## L

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**Landing:** The place to which logs are carried for loading onto logging trucks.

**Leave tree:** A live tree left on a timber sale after harvest, intended to provide habitat and structure in the developing stand.

**Long-term site productivity:** The ability of an area to support plants and wildlife.

## M

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**Maintenance and enhancement phase:** The time between the attainment of the 40 percent Young Forest Habitat and better threshold and the end of the HCP permit period (2067).

**Management approach.** A broad framework for how to achieve a vision, such as integrated management.

**Management pathway:** A course of action for achieving a set of objectives for the northern spotted owl conservation strategy.

**Management strategy.** Specific steps DNR will take to implement each component of an HCP conservation strategy or other policy.

**Measurable objective.** A desired outcomes based on goals. Measurable objectives are used to evaluate whether DNR is meeting its goals.

**Mission.** A statement of purpose, based on an organization's values.

## N

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**Natural area preserve (NAP):** A state-designated area that protects a high-quality, ecologically important natural feature or rare plant and animal species and their habitat. It often contains a unique feature or one that is typical of Washington State or the Pacific Northwest.

**Natural resources conservation area (NRCAs):** A state-designated area managed to protect an outstanding example of a native ecosystem or natural feature; habitat for endangered, threatened, or sensitive species; or a scenic landscape.

**Net present value:** A financial term referring to the sum of both current and future cash flow. It is the cash inflow (revenue from timber sales) minus cash outflow (costs of forest management).

**Non-declining yield:** A flow of goods or services that does not decrease in successive periods (Society of American Foresters [SAF] 2013). In the context of the riparian watershed assessment automated in the tactical

model, non-declining yield means the riparian forest's potential to provide large woody debris or shade to the stream either remains the same or increases over time.

## O

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**Old Forest Habitat:** A grouping of northern spotted owl habitat that supports all of the owl's life history requirements (roosting, foraging, dispersal, and nesting). Old Forest Habitat is an aggregate of Type A, Type B, and high-quality nesting habitat.

**Old growth:** Per DNR policy, forest stands of five acres or larger in the most structurally complex stage of development with a natural origin date prior to 1850.

## P-Q

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**Passive management:** Allowing a stand to develop without intervention. Active and passive management are deliberate silvicultural decisions.

**Pathway:** *see* management pathway.

**Peak flow:** Periods of high stream flow or maximum discharge, usually associated with storm events.

**Planning from a landscape perspective:** A multi-scale approach to planning that was recommended in the HCP as a means of implementing integrated management. This type of planning involves looking at the entire land base at different spatial scales to determine the best means of meeting multiple objectives over time.

**Pre-commercial thinning:** Removal of less desirable trees to maintain the growth and stability of retained trees. Pre-commercial thinning is performed before the trees are large enough to be marketable. This type of thinning does not generate revenue, and cut trees are left on site to decompose.

**Procedure.** Instructions for foresters completing tasks in the field. Procedures often are written to implement management strategies.

## R

**Reduction of uncertainty:** Obtaining knowledge (information or data) that increases understanding of the existing system and/or confidence in future outcomes. Although many uncertainties can be reduced through scientific investigation, uncertainties cannot be eliminated completely.

**Regeneration harvest:** Also called a stand replacement or final harvest. The harvest that signifies the end of a forest rotation; the harvest of trees to make room for regeneration of a new forest stand.

**Relative density (RD):** A mathematically derived parameter that indicates the level of intra-stand competition between trees, and consequently, a theoretical optimal range for thinning. A commonly used version of RD is formally known as Curtis' RD after Bob Curtis, a United States Forest Service biometrician who developed the measure.

**Reliable information:** Information that can be trusted. In the strict scientific sense, "reliable" refers to *giving consistent results*. In the context of adaptive management, the term is used more broadly to mean *objective* and *accurate*.

**Restoration phase:** The time it takes a landscape to attain the 40 percent Young Forest Habitat and better threshold.

**Riparian area:** Where aquatic and terrestrial ecosystems interact. Riparian areas include surface waters such as rivers, streams, lakes, ponds, and wetlands, and the adjacent forests and groundwater zones that connect the water to the surrounding land.

**Riparian management zone:** An area of trees and shrubs adjacent to the stream managed to meet the objectives of the HCP riparian conservation strategy. It consists of an interior-core buffer and an exterior wind buffer.

**Road maintenance and abandonment plan (RMAP):** A plan that covers all forest roads on a landowner's property constructed or used for forest practices after 1974. It is based on a complete inventory that also shows streams and wetlands adjacent to or crossed by roads. The plan lays out a strategy for maintaining existing roads to meet state standards and shows areas of planned or potential road abandonment.

**Rotation:** The period between regeneration of a stand (through planting or natural regeneration) and final harvest.

**Rutting:** A furrow or groove in the soil.

## S

**Severe endemic windthrow:** Endemic windthrow that results in significant loss of riparian function, such as substantial reductions in shade.

**Silviculture:** The art and science of managing forests to accomplish objectives.

**Silvicultural activity:** Actions directed at assessing or controlling the harvesting, regeneration, composition, growth, structure or other attribute of a forest stand. Specific activities include site assessments, evaluations, site preparation, planting, vegetation control, thinning, and harvesting. Silvicultural activities are often referred to as treatments.

**Silvicultural objectives:** A desired future state that is defined through discrete measurable parameters, such as desired stocking levels, or percent of ground covered by down wood. Silvicultural objectives are based on stand- and landscape-level capabilities, and may be related to any valued forest resource or social, environmental, and economic outcomes.

**Silvicultural prescription:** The timing and sequence of silvicultural activities required to attain or sustain objectives over the course of an entire rotation.

**Silvicultural regime:** the specific sequence of activities defined in the silvicultural prescription.

**Silvicultural system:** A grouping of similar silvicultural prescriptions or regimes, usually based on similarity of treatments or objectives. Historically, silvicultural systems were grouped and labeled as “even-aged” or “uneven-aged” based on the number of age classes or regeneration methods (SAF 2013).

**Special forest products:** Items that can be harvested from forests but do not fall in traditional timber or fiber categories, such as Christmas trees and boughs, medicinal plants, and floral greens.

**Stand development stage:** A developmental phase of a forest, defined using a classification system based on the structural conditions and developmental processes occurring within a forest stand.

**Stand replacement harvest:** *see* regeneration harvest.

**State Environmental Policy Act:** A state law that provides a process for reviewing proposals that require permits or other forms of agency approval. It requires government agencies to consider the potential environmental consequences of their actions and incorporate

environmental values into their decision-making processes. It also involves the public and provides the agency decision-maker with supplemental authority to mitigate identified impacts.

**State-of-the-forest file:** An output of the tactical model. A forecast of forest conditions that are projected to occur as a result of implementing the tactical model's harvest schedule.

**State trust lands:** DNR-managed lands held as a fiduciary trust and managed to benefit specific trust beneficiaries (for example, public K–12 schools and universities, capitol buildings, counties, and local services such as libraries).

**Stream type:** On state trust lands in western Washington, DNR State Lands uses a numerical system (one through five) to categorize streams based on their physical characteristics such as stream width, steepness, and whether or not fish are present. Type 1 streams are the largest, Type 5 streams are the smallest. DNR and the Federal Services (NOAA Fisheries and USFWS) have agreed that the Washington Forest Practices Board Emergency Rules (stream typing), November 1996 meet the intent of DNR's HCP. Following are the emergency rules.

**“Type 1 Water”** means all waters, within their ordinary high-water mark, inventoried as “shorelines of the state” under Chapter 90.58 RCW and the rules promulgated pursuant to Chapter 90.58 RCW, but not including those waters' associated wetlands as defined in Chapter 90.58 RCW.

**“Type 2 Water”** shall mean segments of natural waters that are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which:

- a. Are diverted for domestic use by more than 100 residential or camping units or by a public accommodation facility licensed to serve more than 100 persons, where such diversion is determined by the Department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;
- b. Are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet including tributaries if highly significant for protection of downstream water quality. The Department may allow additional harvest beyond the requirements of Type 2 Water designation,

provided the Department determines after a landowner-requested on-site assessment by the Department of Fish and Wildlife, Department of Ecology, the affected tribes, and the interested parties that:

- (i) The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and
  - (ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery;
- c. Are within a federal, state, local, or private campground having more than 30 camping units: *Provided* that the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement;
- d. Are used by substantial numbers of anadromous or resident game fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations:
  - (i) Stream segments having a defined channel 20 feet or greater in width between the ordinary high-water marks and having a gradient of less than 4 percent.
  - (ii) Lakes, ponds, or impoundments having a surface area of 1 acre or greater at seasonal low water.
- e. Are used by salmonids for off-channel habitat. These areas are critical to the maintenance of optimum survival of juvenile salmonids. This habitat shall be identified based on the following criteria:
  - (i) The site must be connected to a stream bearing salmonids and accessible during some period of the year; and
  - (ii) The off-channel water must be accessible to juvenile salmonids through a drainage with less than a 5% gradient.

**“Type 3 Water”** shall mean segments of natural waters that are not classified as Type 1 or 2 Water and have a moderate to slight fish,

wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:

- a. Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, which such diversion is determined by the Department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;
- b. Are used by significant numbers of anadromous or resident game fish for spawning, rearing or migration. If fish use has not been determined:
  - (i) Waters having the following characteristics are presumed to have significant anadromous or resident game fish use:
    - (A) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in western Washington and having a gradient 16 percent or less;
    - (B) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient greater than 16 percent and less than or equal to 20 percent; and having greater than 50 acres in contributing basin size in western Washington;
  - (ii) The Department shall waive or modify the characteristics in (i) above where:
    - (A) Waters are confirmed, long-term, naturally occurring water quality parameters incapable of supporting anadromous or resident game fish;
    - (B) Snowmelt streams have short flow cycles that do not support successful life history phases of anadromous or resident game fish. These streams typically have no flow

in the winter months and discontinue flow by June 1; or

- (C) Sufficient information about a geographic region is available to support a departure from the characteristics in (i), as determined in consultation with the Department of Fish and Wildlife, Department of Ecology, affected tribes, and interested parties.
  - (iii) Ponds or impoundments having a surface area of less than 1 acre at seasonal low water and having an outlet to an anadromous fish stream.
  - (iv) For resident game fish ponds or impoundments having a surface are greater than 0.5 acre at seasonal low water.
- c. Are highly significant for protection of downstream water quality. Tributaries which contribute greater than 20 percent of the flow to a Type 1 or 2 Water are presumed to be significant for 1,500 feet from their confluence with the Type 1 or 2 Water or until their drainage area is less than 50 percent of their drainage area at the point of confluence, whichever is less.

**“Type 4 Water”** classification shall be applied to segments of natural waters which are not classified as Type 1, 2 or 3, and for the purpose of protecting water quality downstream are classified as Type 4 Water upstream until the channel width becomes less than 2 feet in width between the ordinary high-water marks. Their significance lies in their influence on water quality downstream in Type 1, 2, and 3 Waters. These may be perennial or intermittent.

**“Type 5 Water”** classification shall be applied to all natural waters not classified as Type 1, 2, 3, or 4; including streams with or without well-defined channels, areas of perennial or intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.

## T

**Tactical model:** The forest estate model that DNR uses for harvest scheduling and other tasks.

**Tail hold:** A stump or tree which is used to support a block through which a cable runs back to a yarder (a machine used to move logs to a landing).

**Trust:** a relationship in which a person (or entity), the trustee, holds title to property that must be kept or used for the benefit of another, the beneficiary. According to the *Policy for Sustainable Forests*, a trust includes a grantor (the entity establishing the trust, such as the federal government), a trustee (the entity holding the title), one or more trust beneficiaries (entities receiving the benefits from the assets), and trust assets (the property kept or used for the benefit of the beneficiaries) (DNR 2006 p. 14). Washington State is the trustee of state trust lands and DNR is the trust land manager.

## U

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**Uncertainty:** Based on common usage, not knowing whether a proposition is true or false. It may refer to a current state or future outcome. In natural resource management, the main types of uncertainties are regarding the structure and functioning of an ecosystem and the management effects, including ecological, economic and operational feasibility outcomes. In this forest land plan, the following terms are used interchangeably: uncertainty, incomplete information, and limited knowledge.

## V

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**Validation monitoring:** For the *State Trust Lands Habitat Conservation Plan*, a data-collection system that determines whether or not certain species respond as expected to habitat conditions created by following a management plan and its strategies.

**Variable density thinning:** A type of commercial thinning in which a mixture of small openings (gaps), un-thinned patches (skips), and varying stand densities are created to achieve specific objectives, such as accelerating development of complex stand structure.

**Variable retention harvest:** a type of regeneration, or stand-replacement harvest in which elements of the existing stand, such as down wood, snags, and leave trees (trees that are not harvested), are left

for incorporation into the new stand. Variable retention harvest is different from a clearcut, in which all of the existing stand is removed.

**Vision:** A desired outcome based on an organization's values. *See goal.*

## W

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**Windthrow:** Blowing over or breaking of trees in the wind.

## X-Z

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**Yarding:** Transporting logs from where they are harvested to a landing.

**Yarding corridor:** The route used for yarding logs from where they are harvested to a landing.

**Young Forest Habitat:** Forests that meet the structural definition of sub-mature and young forest marginal habitat. Young Forest Habitat supports dispersal and provides some opportunities for roosting and foraging.

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